

33 detecting magnetic leakage fields leaking from the magnetic marks with the reproducing magnetic head, and controlling the position of the reproducing magnetic head using the detected magnetic leakage fields, during information reproduction.

REMARKS

Claims 1-20 are pending. By this Amendment, claims 1, 6-8 and 16 are amended. Reconsideration in view of the above amendments and following remarks is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. §1.121(b)(1)(iii)) and claim (37 C.F.R. §1.121(c)(1)(ii)).

✓ The Office Action objects to the title of the invention as not being descriptive. Applicants amend the title to be more clearly indicative of the invention to which the claims are directed. Accordingly, Applicants respectfully request that the objection to the title be withdrawn.

✓ Applicants gratefully appreciate the courtesy extended to the Applicants' attorney during the October 15 personal interview with Examiner Psitos. The points discussed are reemphasized in this Amendment.

The Office Action objects to the drawings because the drawings may show every feature of the invention specified in the claims. Applicants amend claim 8 for clarification. Accordingly, Applicants respectfully request that the objection to the drawings be withdrawn.

The Office Action rejects claims 6-9 and 11-20 under 35 U.S.C. §102(b) as being anticipated by Oshima (U.S. Patent No. 5,473,584); claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Oshima, and further in view of Applicants' description of the related art; claims 1-6 are rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over Oshima, and further in view of Applicants' description of the related art; claims 6-8, 16, 14, 15, 19 and 20 are rejected under 35 U.S.C. §102(e) as being anticipated by Birukawa I and II (U.S. Patent Nos. 5,986,977 and

6,269,056); claims 10, 11, 13 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' description of the related art, and further in view of Saga ("A New Perpendicular Magnetic Recording Method with a Magnetic-Optical Common Preformat"); and claims 9, 12 and 17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Applicants' description of related art, and further in view of Saga and Diepers (U.S. Patent No. 4,924,334). Applicants respectfully traverse the rejections.

In particular, Applicants assert that neither Oshima, Applicants' description of the related art, Birukawa I and II, Saga or Diepers, either alone or in combination, disclose or suggest an information recording medium, having at least a substrate formed without pitted information, and a magnetic layer wherein the information is recorded onto the magnetic layer with a light and an external magnetic field, and is reproduced from the magnetic layer by detecting a magnetic leakage field leaking from the magnetic mark, as recited in independent claim 1. ✓

Moreover, neither Oshima, Applicants' description of the related art, Birukawa I and II, Saga or Diepers, either alone or in combination, disclose or suggest a recording and reproducing apparatus, including at least a second positioner for positioning a reproducing magnetic head at a target track during information reproduction, with the reproducing magnetic head using the detected magnetic leakage fields leaking from the magnetic marks to position the reproducing magnetic head, as recited in independent claim 6, and similarly recited in independent claim 16.

Specifically, the magneto-optical recording mediums described in the related art of the Applicants' specification have pits (i.e., recessed and embossed patterns) formed on predetermined regions so that a magnetic head and an optical head can track the code tracks of the recording medium. However, while a floating slider on which the magnetic and optical heads are mounted is scanning over the regions where the pits are formed, the floating slider may contact the recording medium and cause a head crash.

Oshima discloses a recording medium that *includes pits* formed in this manner. See for example Figs. 9 and 23.

Birukawa I and II disclose a reading method for a magneto-optical recording medium that uses recording and servo tracks. See Figs. 5 and 6. The recording medium is read according to a length of recording marks by reading the recording medium while impressing a magnetic field with an orientation promoting the translation of magnetic domain walls.

Saga discloses a perpendicular thermo-magnetic recording method coupled with magnetic flux detection. On a surface of the substrate of the recording medium, *embossed pits are formed*. See page 226, col. 2, lines 28-29. ✓

Diepers discloses a magnetic storage device where *servo tracks* are formed on the storage disk. See Fig. 3. Moreover, a track guidance system has a servo head formed on a long side face of a flying body in the form of a magneto restrictive sensor.

In stark contrast to Applicants' claimed invention, neither Oshima, Applicants' description of the related art, Birukawa I and II, Saga or Diepers disclose or suggest an information recording medium, having at least a substrate formed without pitted information, and a magnetic layer wherein the information is recorded onto the magnetic layer with a light and an external magnetic field, and is reproduced from the magnetic layer by detecting a magnetic leakage field leaking from the magnetic mark.

Moreover, neither Oshima, Applicants' description of the related art, Birukawa I and II, Saga or Diepers, either alone or in combination, disclose or suggest a recording and reproducing apparatus, including at least a second positioner for positioning a reproducing magnetic head at a target track during information reproduction, with the reproducing magnetic head using the detected magnetic leakage fields leaking from the magnetic marks to position the reproducing magnetic head.

On the contrary, Oshima, Applicants' description of the related art and Saga all disclose that pits (or pitted information) are formed on the recording medium. Thus, when a

floating slider on which the magnetic and optical heads are mounted is scanning over the regions where the pits are formed, the floating slider can contact the recording medium and cause a head crash.

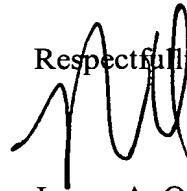
Furthermore, nowhere in the applied references is it disclosed or suggested that a reproducing magnetic head uses detected magnetic leakage fields leaking from a magnetic marks to position the reproducing magnetic head.

Accordingly, because the applied references fail to disclose each and every feature as the claimed invention, and because it would not have been obvious to modify Oshima with the Applicants' description of the related art to arrive at the claimed invention, Applicants assert that independent claims 1, 6 and 16 define patentable subject matter. Claims 2-5, 7, 8, 10, 11, 13-15 and 18-20 depend from the independent claims and therefore also define patentable subject matter. Finally, because Saga and Diepers fail to compensate for deficiencies in Applicants' description of the related art, Applicants assert that claims 9, 12 and 17 define patentable subject matter. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. §102 and 35 U.S.C. §103(a) be withdrawn.

In view of the foregoing, Applicants submit that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-20 are earnestly solicited.

Should the Examiner believe that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' attorney at the telephone number listed below.

Respectfully submitted,



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Attachment:
Appendix

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
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APPENDIX

Changes to Title:

The following is a marked-up version of the amended title:

INFORMATION RECORDING MEDIUM WITH MAGNETIC MARKS, RECORDING
AND REPRODUCING APPARATUS THEREFOR, AND REPRODUCING HEAD
POSITIONING METHOD USING A ~~SERVO PATTERN BEING FORMED AS~~
~~MAGNETIC MARKS~~ DETECTED MAGNETIC LEAKAGE FIELDS FROM MAGNETIC
MARKS

Changes to Claims:

The following is a marked-up version of the amended claims:

1. (Twice Amended) An information recording medium on which information is recorded with light and an external magnetic field applied to the recording medium, the information recording medium comprising:

a substrate formed without pitted information; and

a magnetic layer formed on the substrate;

the magnetic layer including a data region and a positioning region, the positioning region having management information for managing the data region and a servo pattern, the management information and the servo pattern being formed as magnetic marks, wherein the information is recorded onto the magnetic layer with the light and the external magnetic field and is reproduced from the magnetic layer by detecting a magnetic leakage field ~~generated leaking from the magnetic layer~~ mark.

6. (Amended) A recording and reproducing apparatus for recording information on and reproducing information from an information recording medium including a substrate and a magnetic layer provided on the substrate, the magnetic layer having a servo pattern and

management information recorded thereon as magnetic marks, the recording and reproducing apparatus comprising:

an optical head for irradiating the information recording medium with light during information recordation;

a recording magnetic head for applying a recording magnetic field to the information recording medium;

a reproducing magnetic head for detecting magnetic leakage fields from the magnetic marks on the magnetic layer during information reproduction;

a first positioner for positioning the optical head and the recording magnetic head at a target track of the information recording medium on the basis of magneto-optical signals from the magnetic marks; and

a second positioner for positioning the reproducing magnetic head at the target track during information reproduction, with the reproducing magnetic head using the detected magnetic leakage fields leaking from the magnetic marks to position the reproducing magnetic head.

7. (Amended) The recording and reproducing apparatus defined in Claim 6, wherein the first positioner includes:

a detector for detecting light from the magnetic marks;

a first control signal generator for obtaining positional information about the optical head and the recording magnetic head from detected signals from the magnetic marks detected by the detector, and generating a control signal for positioning the optical and recording magnetic heads at the target track; and

~~a first~~ an actuator for moving the optical head and the recording magnetic head to the target track on the basis of the control signal.

8. (Amended) The recording and reproducing apparatus defined in Claim 6, wherein the second positioner includes:

a second control signal generator for obtaining positional information about the reproducing magnetic head from signals from the magnetic marks detected by the reproducing magnetic head, and generating a control signal for positioning the reproducing magnetic head at the target track; and

~~a second~~ an actuator for moving the reproducing magnetic head to the target track on the basis of the control signal from the second control signal generator.

16. (Amended) A method for positioning an optical head, a recording magnetic head and a reproducing magnetic head at a predetermined track of an information recording medium including a substrate and a magnetic layer provided on the substrate, the magnetic layer having magnetic marks recorded thereon which represent a servo pattern and management information, the method comprising the steps of:

irradiating the information recording medium with a laser beam to detect magneto-optical signals from the magnetic marks, and controlling the positions of the optical head and the recording magnetic head on the basis of the detected magneto-optical signals, during information recordation; and

detecting magnetic leakage fields leaking from the magnetic marks with the reproducing magnetic head, and controlling the position of the reproducing magnetic head ~~on the basis of~~ using the detected magnetic leakage fields, during information reproduction.